

EAT•N

Powerware

Powerware 9390
40 - 160 kVA



The industry’s best combination of efficiency, management of THD, power factor, and power protection

With the introduction of the Powerware 9390, you can now enjoy an unmatched combination of power protection features in a single system. The new three-phase UPS is the result of comprehensive research and user insight gathered by Eaton to develop the best combination of power performance, battery management, scalable architecture, flexibility, and service.

The Powerware 9390 UPS features innovations that combine to deliver the industry’s best overall power performance. Built on more than 40 years of UPS design expertise, the Powerware 9390 excels in four key factors:

- 1. Efficiency - maximum usable output power relative to input power
- 2. Total harmonic distortion (THD) - keeping input current distortion within acceptable limits
- 3. Power factor - managing phase shifts between voltage applied and current drawn by circuits
- 4. Double-conversion topology - complete isolation of protected loads from input utility power

High efficiency reduces overall cost of ownership

The efficiency rating of a UPS is a measure of the energy the UPS uses for its own operation and dissipates usually in the form of heat. For example, a UPS that is 90 per cent efficient delivers 90 kW of useful output power for every 100 kW it takes in. The more efficient the UPS, the less you pay to run your protected equipment and to cool the UPS.

With a transformerless design and sophisticated sensing and control circuitry, the Powerware 9390 UPS delivers an efficiency of up to 94 per cent. In addition to dramatic cost savings, this level of system efficiency extends battery run times and

produces cooler operating conditions within the UPS, which extends the life of components and increases overall reliability and performance.

Low THD enhances compatibility with generators

The Powerware 9390 uses a new input circuit that is uniquely capable of keeping Total Harmonic Distortion (THD) at a low level—less than 5 per cent—without compromising efficiency. A key benefit is that the UPS is therefore compatible with a wide range of generators, even though generator output frequencies will fluctuate when the UPS transitions to generator power and as other loads are started up.

Power factor performance maximises compatibility and meets high power factor load requirements

The closer the power factor is to unity, the more efficient the transfer of power between source and load. With an input power factor of 0.99, the Powerware 9390 UPS is exceptionally compatible

TYPICAL APPLICATIONS:

- Data centres, server farms
- Building, banking and telecommunication systems
- Industrial automation equipment
- Healthcare systems

with diverse power sources, especially auxiliary generators.

On the output side, the 9390 can also provide its full power capability to loads that have a wide range of leading and lagging power factors, spanning all known computer loads.

Double-conversion topology provides the best protection possible

With the Powerware 9390’s double-conversion process, your sensitive electronic systems are completely isolated from raw utility power and all its irregularities. Double conversion provides the highest level of protection available and enables equipment to perform to manufacturer specifications.

Whether you are selecting a UPS for a branch office, manufacturing floor, medical facility, or a large data centre, there is a Powerware 9390 model that delivers just the right combination of performance and price for your needs. Visit our website www.powerware.com for more information.

POWERWARE 9390’S EFFICIENCY TRANSLATES INTO BIG SAVINGS:		
	Competitive UPS, efficiency 90%	Powerware 9390, efficiency up to 94%
Utility power dissipated (per year)	87,600 kWh	52,560 kWh
Energy cost €(at 0.08/kWh)	€7,008	€4,205
Cooling cost	€2,336	€1,388
Total	€9,344	€5,593
Annual savings	–	€3,751

Communication options -connect anywhere



ConnectUPS Web/SNMP card is a complete UPS monitoring, control and shutdown solution in a networked IT environment. In case of alert, the Web/SNMP card can notify users and administrators through e-mail and SNMP traps. In case of a prolonged power failure the protected computer systems can be shut down in a graceful manner with NetWatch and LanSafe software.

HTTP, SNMP, e-mail, WAP and Telnet compatibility enable dynamic and versatile support for a large variety of system configurations.

The XSlot card for the 9390 also integrates a 3-port switching hub to support multiple PCs or networking equipment.

Environmental Monitoring Probe (EMP) enables you to remotely monitor environmental conditions as easily as you monitor power conditions. It adds temperature, humidity and two contact closure monitoring capabilities to ConnectUPS Web/SNMP card. It can trigger operating system shutdown if user-defined thresholds

are exceeded or contact closure status changes.

Relay/AS400 card provides an easy connection to IBM AS/400 series computers as well as industrial and building management systems. You can also build a solution for a remote ON/OFF function with the relay card.

Powerware Software Suite, our exclusive collection of software on a CD-rom, incorporates a full line of shutdown and monitoring software products to enhance the protection provided by Powerware UPSs. The software suite, conveniently packed on one CD-rom, follows every UPS free of charge.

ConnectUPS
Web/SNMP xHub



Powerware Modbus Card is an XSlot™ UPS connectivity device that provides continuous, reliable and accurate remote monitoring of your UPS system through a Building Management System (BMS) or Industrial Automation System (IAS). The card integrates data from the UPS into the user's management system using Modicon®, Modbus RTU Protocol. Key power quality and UPS status information may be monitored in real time to aid in the management of the UPS and notification of potential power problems.

Multi-Server card is a power quality connectivity product designed to enable multiple devices connected to a single UPS system to be managed and controlled independently. The Multi-Server Card allows separate communication with up to six connected servers with mixed operating systems.

XSlot modem card connects your UPS device to Powerware's remote monitoring centre for a 24/7 software based, fully automatic remote UPS inspection over the telephone network.



1. POWER FAILURE



2. POWER SAG



3. POWER SURGE



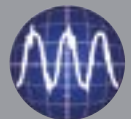
4. UNDERVOLTAGE



5. OVERVOLTAGE



6. SWITCHING TRANSIENT



7. LINE NOISE



8. FREQUENCY VARIATION



9. HARMONIC DISTORTION

Revolutionary feature integration

The Powerware 9390 UPS is a double-conversion UPS that resolves all utility power problems and supplies clean, continuous, uninterruptible power to all connected equipment.

Efficiency and power factor control for optimum performance

The Powerware 9390 operates at a high efficiency of up to 94 per cent, which reduces utility costs and extends battery run times. Higher system efficiency produces cooler operating conditions, which reduces facility air conditioning cost, extends the life of UPS components, and increases overall reliability, availability, and performance.

A new input circuit design keeps input current THD low and input power

factor near unity without compromising overall efficiency. As a result, the Powerware 9390 allows maximum transfer of power between power source and protected load and is exceptionally compatible with multiple power sources, especially auxiliary generators. On the output side, the ultra high speed switching Pulse Width Modulation (PWM) inverter enables the Powerware 9390 to provide its full rated power capability to the load whether the load power factor is 0.9 lagging, unity, or 0.9 leading.

Hot Sync—unbreakable security

Eaton's Hot Sync parallels two or more UPS units. Units are capable of load sharing without the need for communications wiring, hitherto the most vulnerable point of failure in all UPS systems. Each Powerware module has the ability to synchronise and support the critical load independently of the other modules. Thus all critical loads are supported by UPS-grade power, whatever maintenance needs—scheduled or unscheduled—should arise.

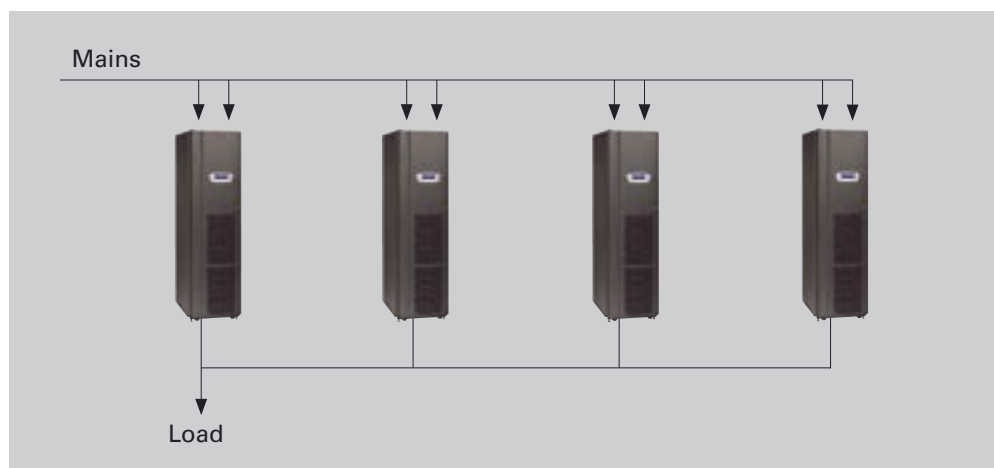
Hot Sync—redundant is an N+1 module system allowing full maintenance to be performed on all modules and the parallel cabinet without the need for an external maintenance bypass and without having to remove the critical load from conditioned power.

Sync Control gives reliable downstream distribution

The Sync Control function maintains UPS output in sync with the external power source or another independent source. This ensures the permanent synchronisation of two independent UPS systems when the reference source at the bypass input is absent. Sync Control enables the independent operation of both UPS units without introducing a single point of failure. This provides synchronous transfer capabilities to downstream load transfer systems.

Double-conversion design offers the highest protection possible

The double-conversion design completely isolates output power from all input power anomalies and delivers 100-per cent conditioned, perfect sine-wave output—regulating both voltage and frequency. Voltage is constantly held within two per cent of nominal specification for linear loads and within three per cent for nonlinear loads. This makes the 9390 ideal for equipment that is particularly sensitive to voltage fluctuations. In the event of a utility power failure, there is no delay transferring to backup power.



Hot Sync Redundancy/Capacity - 4 x UPS with integral static switch

Advanced Battery Management delivers performance and longer service life

When a utility power outage causes a UPS to switch to battery backup—even momentarily—you have to be sure the batteries are healthy, charged and up to the task. Powerware's battery configuration and management strategies help keep your batteries at peak performance.

Eaton's patented Advanced Battery Management (ABM™) technology uses a unique three-stage charging technique that significantly extends battery service life and optimises recharge time, compared to traditional trickle charging. An integrated battery management system tests and monitors battery health and remaining lifetime, and provides advance notification to guide preventive maintenance. Optional temperature-compensated charging monitors temperature changes and adjusts the charge rate accordingly, which properly charges the battery and greatly extends battery life. Many UPS models also have a Hot Swap feature allowing battery change without disconnecting the unit.

Industry-leading warranty and service plans deliver peace of mind

The Powerware 9390 UPS and its battery system deliver confidence. We back it up with the industry's most extensive warranty and service plans. The 9390 features an optional 24-month limited warranty with coverage for parts and labour. This optional warranty comes with a service protection package, which includes Start-Up service, UPS preventive maintenance and battery health check. Beyond the 12-month standard and 24-month extended warranty periods, other service plans are available to match any need. Our top-of-the-line service packages are all-inclusive with unique features, such as advanced remote monitoring, customised UPS and battery capacity planning reports, and comprehensive power protection audits.

Scalable architecture meets your current and future load requirements

The Powerware 9390 supports loads from 40 kVA to 160 kVA to deliver power protection for small branch offices to large corporate data centres and communication networks.

Up to four equivalent UPS modules can be paralleled for additional capacity or redundancy, without having to use a system parallel cabinet. Up to eight UPS modules can be paralleled by using a centralised bypass cabinet. In all paralleling configurations, each UPS module operates independently yet is completely synchronised with the others. Parallel UPS modules can provide N+1, N+2, or greater redundancy.

Flexible installation options expedite deployment and save space

The Powerware 9390 offers small footprint compared to competitive UPS offerings. Cabling can enter the UPS from either the top or bottom of the cabinet to provide easier and flexible installation. Front panel access facilitates services and operation, thereby reducing Mean Time to Repair (MTTR). And since the compact Powerware 9390 cabinet can be installed against back and side walls, you have more location options, installation is fast and easy, deployment cost is lower, and you save valuable data centre space for future expansion.



Powerware 9390 line-up (with battery cabinet)

Dimensions



UPS 40-80 kVA dimensions



Weight	Description
257 kg	9390-40 kVA
313 kg	9390-60 kVA
313 kg	9390-80 kVA
480 kg	9390-100 kVA
480 kg	9390-120 kVA
530 kg	9390-160 kVA

Accessories

Isolation output transformer

External Mechanical Bypass Switch (EMBS)

9390-MBS-120 kVA	45 kg
9390-MBS-160 kVA	55 kg

Battery cabinets (BAT)

9390-BAT10-40x55 Ah	1270 kg (10 years)
9390-BAT10-40x67 Ah	1430 kg (10 years)
9390-BAT10-40x125 Ah	2350 kg (10 years)

Connectivity

XSlot: Web/SNMP card
XSlot: AS/400 relays card
XSlot: Modem card
XSlot: USB port
XSlot: RS232 port
XSlot: Modbus/Jbus card
XSlot: Hot Sync card

Specials:

Dual bus solution (Sync Control)
Static Transfer Switches (STS)
Centralised bypass cabinets
System parallel tie cabinets
Battery racks

Technical Specifications

Rating	40 kVA	60 kVA	80 kVA	100 kVA	120 kVA	160 kVA
Part number	9390-40-N	9390-60-U	9390-80-N	9390-100-U	9390-120-N	9390-160-N
	9390-BAT10-40x55Ah	9390-BAT10-40x55Ah	9390-BAT10-40x55Ah		9390-120-U	
	9390-BAT10-40x67Ah	9390-BAT10-40x67Ah	9390-BAT10-40x67Ah	9390-BAT10-40x67Ah	9390-BAT10-40x67Ah	9390-BAT10-40x67Ah
	9390-BAT10-40x125Ah	9390-BAT10-40x125Ah	9390-BAT10-40x125Ah	9390-BAT10-40x125Ah	9390-BAT10-40x125Ah	9390-BAT10-40x125Ah
Capacity (kVA/kW)	40/36	60/54	80/72	100/90	120/108	160/144
Dimensions WxHxD (mm)	519x1872x804	519x1872x804	519x1872x804	900x1872x804	900x1872x804	900x1872x804
Weight (kg)						
UPS	257	313	313	480	480/530	530
9390-BAT10-40x55 Ah	1270					
9390-BAT10-40x67 Ah	1430					
9390-BAT10-40x125 Ah	2350					
Input connection	Dual input, hardwired					
Output connection	Hardwired					
Typical runtime						
UPS+1xBAT 55 Ah	30 min	17 min	10 min	8 min	6 min	—
UPS+1xBAT 67 Ah	39 min	21 min	15 min	12 min	10 min	—
UPS+1xBAT 125 Ah	87 min	53 min	36 min	27 min	20 min	12 min

Operational

Nominal input voltage (Vac)	220/380, 230/400, 240/415 VAC 50/60 Hz
Input voltage range	-15%, +10% from nominal at 100% load
Operating frequency	50 Hz or 60 Hz (45-65 Hz)
Input power factor	0,99
Input current distortion	< 5% THDi typical
Nominal output voltage	220/380, 230/400, 240/415 VAC
Output voltage regulation	±1% static, ±5% dynamic at 10% to 90% load change, < 1 ms recovery time
Overload capacity	101-110% for 10 min
	111-125% for 1 min
	126-150% for 10 sec
	1000% for one cycle (bypass)
Efficiency	up to 94%

User interface

LCD display	Graphical LCD with blue backlight
LED	4 status indicators
Standard communication ports	(2 or 4) x XSlot, 1 x relay contact, 1 x emergency power-off input, 2 x environmental inputs
Optional	External battery cabinets and racks, Isolation transformer, System Parallel Cabinets; XSlot: SNMP/Web/HUB, ModBus/JBus, Relay, Hot Sync cards

Environmental

Operating temperature	0°C to +40°C, +45°C with 7,5% derating, batteries max +25°C
Storage temperature	-15°C to +45°C
Altitude	< 1500 m
Audible noise at 1 metre	65 dB(A) 40-80 kVA
	70 dB(A) 100-160 kVA

Certification

Quality	ISO 9001 : 2000, ISO 14001 : 1996
Markings	CE, GOST
Safety	IEC 62040-1-1, IEC 60950, EN 62040-1-1
EMC	EN 50091-2